The Accelerator

NEWS, ORGANIZATIONS, STUDENT ENTREPRENEURS

SPOTLIGHT: ROBOTS IN STEM EDUCATION

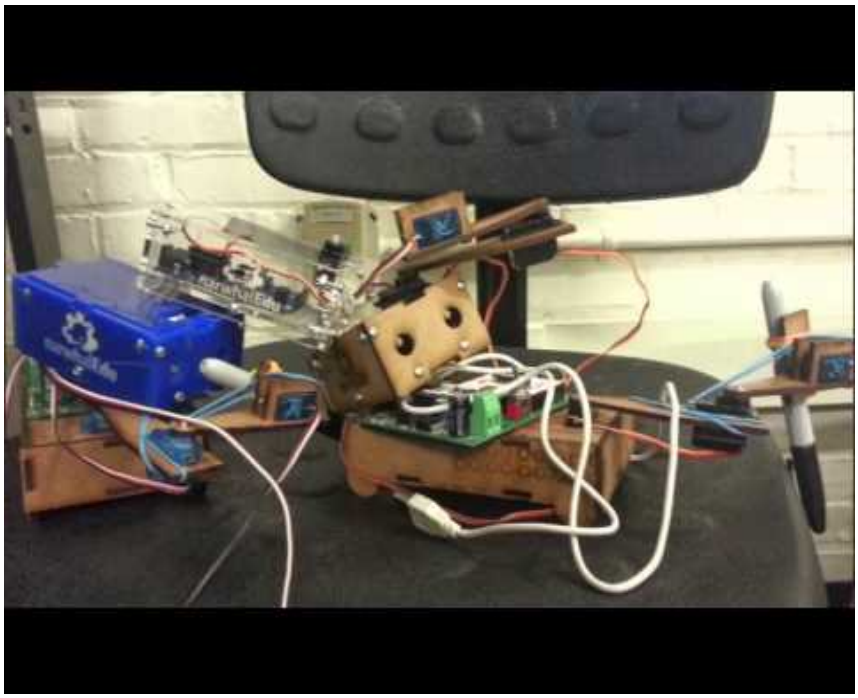
JANUARY 22, 2014 | S.KHAN | LEAVE A COMMENT

Some might say the world is becoming more automated by the day. Robots and artificial intelligence permeate our everyday lives, from doing the dangerous jobs that humans previously performed in manufacturing to asking Apple's Siri where the nearest coffee shop is. Engineers and educators are starting to see the advantages of teaching young students, from elementary students to high school seniors, the basics of building and operating robots. And they're doing it in novel ways that are meant to cut costs without cutting learning possibilities.

Below the cut, read about two companies started by engineering students who are bringing robotics to classrooms around the country.

- MIT mechanical engineering graduate Nancy Ouyang is a fan of narwhals."Some people think they're mythical creatures, but they really exist," she said.One could say the same thing about the idea behind

her company, which is offering online courses with robotic kit components aimed at high-schoolers or those with similar education levels. The two-month-long course teaches students about the basics of engineering by building and programming a real robotic arm that can draw. Ouyang said she knows of only two other universities that are providing online courses that include similar hardware components, and as far as she knows, no other company like **NarwhalEdu** existed when she first founded it with fellow mechanical engineering student Cappie Pomeroy.



Ouyang got the idea while building her first robot arm at a hackathon and attending hacker spaces both in the U.S. and China, and thought about bringing such a course to students around the world. Pomeroy said the potential to give students an engineering course that he wasn't able to take when he was in high school was an exciting prospect. NarwhalEdu's first class has slightly less than 100 students, and will start in February. Of the statistics the team has gathered, the age range of enrollees is wide — from 12 years to over 60, with 10 percent in countries outside the United States, including Australia, the United Kingdom, Canada, China, and South Korea. Students should expect to be able to take the class without knowing trigonometry or any higher math level. NarwhalEdu may not offer the same course in future months or years, Ouyang said, but she's interested in exploring other types of engineering classes that can grab a wider audience. Additionally, the **February class still has a small number of open spots** for those interested in signing up and paying a $199 course fee to cover materials.

- Brian O'Connell, a Tufts university Ph.D. candidate in mechanical engineering, was taken by surprise when he met with students to test out his course on creating **PaperBots**, simple miniature robots that can be made out of low-cost, classroom staples such as paper and craft materials. Instead of the group of 5th and 6th grade students he was expecting to meet, he found five- and six-year-olds. The girl scout troop leader who arranged the meeting must have misheard him when they spoke by phone, he suspects. Undaunted, O'Connell set about redesigning the lesson plans to fit the

intellectual levels of much younger students than originally planned. He simplified the programming interface, and now gives students just a few options to choose from in order to make the robots move and perform tasks."The programming is now geared towards elementary-aged students, so it's programming at its very simplest," he said. "The students don't know all of the black-box aspects inside of it, but later on I want kids to get under the hood a little more." The programming interface and instructions are provided by the course, O'Connell, said, but even the sensors, motors and controllers are meant to be created from common classroom supplies.

.

O'Connell now plans on designing lesson plans for high school students, who can learn to type out each line of code and understand what effects that code has. He has seen a handful of similar projects from Tufts and MIT's Media Lab, but none that fit the typical U.S. public school's tight budgets. He aims to start a Kickstarter page within the next few months and raise enough money to subsidize the kits, bringing the cost per student down to $50. If the price drops low enough, U.S. teachers and donors could sponsor kits for schools in developing countries.

ENGINEERING EDUCATION ROBOTICS STEM EDUCATION